Attachment 13.

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

April 26, 2005

File No.: EN-04-055

CERTIFIED MAIL #7001 0320 0003 0613 6822

Air Quality Permit Compliance
Department of Environmental Quality
Pocatello Regional Office
444 Hospital Way #300
Pocatello, Idaho 83201

Attn: Richard Elkins

RE: Compliance Test Reports

Dear Mr. Elkins,

Please find enclosed two (2) copies of reports for annual source testing conducted at our facility March 30, 2005 and March 31, 2005 by TETCO, a Lehi, Utah testing company. All stack tests were conducted at worst-case normal conditions, as described at IDAPA 58.01.01.157.02.a. The report includes test data for the following sources at our Conda facility, listed with applicable Tier I Operating Permit 029-00003 sections limiting emissions:

Wet Process Phosphoric Acid Process Line (Section 6.1 and 6.26)
Superphosphoric Acid Production Process Line (Section 6.2 and 6.26)

In addition to the reports produced by TETCO, I have included operational monitored data and calculations demonstrating compliance/non-compliance for each test. This information is included with this letter as Supplements 1 & 2 to TETCO's report. Summaries of data and emissions calculations appear below:

Wet Process Phosphoric Acid Process Line (Section 6.1 and 6.26)

Test date: March 30, 2005

Permitted fluoride emissions:	0.0135 lb/Ton P_2O_5 feed
Fluoride emissions during test:	0.0014 lb/Ton P_2O_5 feed [In compliance] ✓
P_2O_5 feed to process during test:	66.12 tons/hr
Pressure drop across Phos scrubber:	9.3 inches H_2O
Pressure drop across CV scrubber:	2.3 inches H_2O
Phos scrubber flow rate:	1201 gpm
CV scrubber flow rate:	216 gpm

* A Registered Name of Nu-West Industries, Inc.

Superphosphoric Acid Production Process Line (Section 6.2 and 6.26)

Test date: March 31, 2005

Permitted fluoride emissions:	0.0087 lb/Ton P_2O_5 feed
Fluoride emissions during test:	0.0046 lb/Ton P_2O_5 feed [In-compliance]
P_2O_5 feed to process during test:	32.15 tons/hr
Pressure drop across SPA scrubber:	7.0 inches H_2O
SPA scrubber flow rate:	576 gpm

As indicated by the sampling data provided by TETCO and the summaries above, all of the source tests and calculations demonstrated compliance to permit limitations.

Opacity readings were performed at similar operating conditions after the tests, due to adverse weather conditions during the tests..

It is our pleasure and opportunity to provide you with this source test information. We appreciate DEQ's assistance in helping us maintain compliance with state and federal air quality regulations.

If you have any questions concerning this letter or the enclosed Compliance Report by TETCO, please call me at (208) 547-4381 extension 263.

Sincerely,

Monty Johnson
Environmental Manager

Attachments: Supplements 1& 2 to TETCO Reports
Enclosures: two (2) copies of TETCO reports for March 30, 2005 and March 31, 2005

TABLE IV
COMPLETE RESULTS
AGRIUM
PHOSPHORIC ACID PLANT SCRUBBER EXHAUST

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/30/05	3/30/05	3/30/05	
Begin	Time Test Began		13:32	15:16	16:45	
End	Time Test Ended		14:34	16:19	17:47	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	23.65	23.65	23.65	
ΔH	Orifice Pressure Drop	In. H_2O	1.679	1.755	1.743	
Y	Meter Calibration Y Factor	dimensionless	1.004	1.004	1.004	
Vm	Volume Gas Sampled--Meter Conditions	cf	49.170	50.256	49.981	
T_m	Avg Meter Temperature	°F	79.9	83.7	80.3	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.6460	0.6483	0.6457	
Wt_{wc}	Weight Water Collected	Grams	37.9	36.8	39.0	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.2545	0.2545	0.2545	
CO_2	Volume % Carbon Dioxide	Percent	1.80	1.80	1.60	
O_2	Volume % Oxygen	Percent	20.20	20.40	20.80	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	78.00	77.80	77.60	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	38.361	38.943	38.972	
Vw	Volume Water Vapor	scf	1.787	1.735	1.839	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.045	0.043	0.045	
X_d	Fraction of Dry Gas	Fraction	0.955	0.957	0.955	
M_d	Molecular Wt. Dry Gas	lb/lbmol	29.10	29.10	29.09	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.60	28.63	28.59	
%I	Percent Isokinetic	Percent	99.0	100.0	100.7	**AVG**
T_s	Avg Stack Temperature	°F	82.3	83.5	83.3	**83**
A_s	Stack Cross Sectional Area	Sq. Ft.	35.785	35.785	35.785	
P_G	Stack Static Pressure	In. H_2O	-0.21	-0.21	-0.21	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	23.59	23.59	23.59	
P_s	Stack Pressure	In. Hg. Abs	23.575	23.575	23.575	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	6.54E+04	6.57E+04	6.54E+04	**6.55E+04**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	8.94E+04	8.97E+04	8.94E+04	**8.95E+04**
V_s	Velocity of Stack Gas	fpm	2.50E+03	2.51E+03	2.50E+03	**2.50E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	0.588	0.301	0.293	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	0.588	0.301	0.293	
C_F	Concentration of Fluoride	lb / dscf	3.38E-08	1.70E-08	1.66E-08	**2.25E-08**
C_F	Concentration of Fluoride	mg/dscf	1.533E-02	7.729E-03	7.518E-03	**1.019E-02**
ER_F	Emission Rate of Fluoride	lb / hr	0.133	0.067	0.065	**0.088**

$\frac{0.007}{0.095}\left(\frac{1}{66.12}\right) = .0014$

TABLE V
COMPLETE RESULTS
AGRIUM CONDA PHOSPHATE
CONDITIONING VENT SCRUBBER

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/30/05	3/30/05	3/30/05	
Begin	Time Test Began		13:32	15:16	16:45	
End	Time Test Ended		14:34	16:19	17:47	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	23.77	23.77	23.77	
ΔH	Orifice Pressure Drop	In. H_2O	1.501	1.618	1.676	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled--Meter Conditions	cf	49.460	51.812	52.519	
T_m	Avg Meter Temperature	°F	71.0	72.8	80.8	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.8337	0.8645	0.8806	
Wt_{wc}	Weight Water Collected	Grams	20.5	16.9	22.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.2220	0.2220	0.2220	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	39.881	41.651	41.603	
Vw	Volume Water Vapor	scf	0.967	0.797	1.042	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.023	0.019	0.022	
X_d	Fraction of Dry Gas	Fraction	0.977	0.981	0.978	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.59	28.63	28.59	
%I	Percent Isokinetic	Percent	100.0	100.3	98.7	**AVG**
T_s	Avg Stack Temperature	°F	60.9	60.5	60.6	61
A_s	Stack Cross Sectional Area	Sq. Ft.	3.142	3.142	3.142	
P_G	Stack Static Pressure	In. H_2O	-0.49	-0.49	-0.49	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	23.77	23.77	23.77	
P_s	Stack Pressure	In. Hg. Abs	23.734	23.734	23.734	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	7.77E+03	8.09E+03	8.21E+03	**8.02E+03**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	9.89E+03	1.02E+04	1.04E+04	**1.02E+04**
V_s	Velocity of Stack Gas	fpm	3.15E+03	3.26E+03	3.32E+03	**3.24E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	0.314	0.312	0.227	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	0.314	0.312	0.227	
C_F	Concentration of Fluoride	lb / dscf	1.74E-08	1.65E-08	1.20E-08	**1.53E-08**
C_F	Concentration of Fluoride	mg/dscf	7.873E-03	7.491E-03	5.456E-03	**6.940E-03**
ER_F	Emission Rate of Fluoride	lb / hr	0.008	0.008	0.006	**0.007**

Generic Any Materials
Default Subreport 1

			ITY+SOLIDS(PH		GRAVIMETRIC P2O5	SITY,SOLIDS,&S	
			Density	Solids	Grav P2O5	Density	Solids
			G / Ml	%	wt.%	G / Ml	%
Sample Date/Time	User Sample ID	Sample ID	(AVG)	(AVG)	(AVG)	(AVG)	(AVG)
3/30/2005 6:00	PHR24HR	200107194			31.22	1.81	67.82

Supplement 2 to TETCO Source Test Report
Superphosphoric Acid Process Line
Test date: March 31, 2005

Nu-west Industries, Inc.
d.b.a. Agrium Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Fluoride Emission Calculation (40 CFR 63.606(c)(1):

$$E = \left(\sum_{i=1}^{N} C_{Si} Q_{sdi} \right) / (PK)$$

Where:
E = emission rate of total fluorides, (lb/ton) of equivalent P_2O_5 feed
C_{si} = concentration of total fluorides from emission point "i", (mg/dscf)
Q_{sdi} = volumetric flow rate of effluent gas from emission point "i", (dscf/hr)
N = number of emission points associated with the affected facility.
P = equivalent P_2O_5 feed rate, (ton/hr)
K = conversion factor, (453,600 mg/lb)

Run #1 **SPA 3/31/05**

Csi =	1.83	mg F/	42.647	DSCF	
Qsdi =	9860	DSCFM	591600	DSCFH	
N =	1				
P =	121	gpm	1.798	SPG	
	59.06	% P2O5	0.2503	gpm-tph	P= 32.13 tons P2O5/hr
K = conversion factor			453600	mg/lb	

E = 0.001742 lbs F/ton P2O5 Emission limit = 0.0087 lbs F/ton P2O5
% of Standard = 20.0

Run #2 **SPA 3/31/05**

Csi =	5.14	mg F/	43.095	DSCF	
Qsdi =	9920	DSCFM	595200	DSCFH	
N =	1				
P =	121	gpm	1.798	SPG	
	59.06	% P2O5	0.2503	gpm-tph	P= 32.16 tons P2O5/hr
K = conversion factor			453600	mg/lb	

E = 0.004866 lbs F/ton P2O5 Emission limit = 0.0087 lbs F/ton P2O5
% of Standard = 55.9

Run #3 **SPA 3/31/05**

Csi =	7.86	mg F/	42.836	DSCF	
Qsdi =	9670	DSCFM	580200	DSCFH	
N =	1				
P =	121	gpm	1.798	SPG	
	59.06	% P2O5	0.2503	gpm-tph	P= 32.16 tons P2O5/hr
K = conversion factor			453600	mg/lb	

E = 0.007298 lbs F/ton P2O5 Emission limit = 0.0087 lbs F/ton P2O5
% of Standard = 83.9

% of Std. Ave. = 53.3

Prepared by: Monty Johnson

TABLE VI
COMPLETE RESULTS
AGRIUM
SUPERPHOSPHORIC ACID PLANT SCRUBBER (SPA)

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/31/05	3/31/05	3/31/05	
Begin	Time Test Began		8:43	10:20	11:48	
End	Time Test Ended		9:47	11:24	12:51	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	24.28	24.28	24.28	
ΔH	Orifice Pressure Drop	In. H_2O	1.725	1.783	1.725	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled--Meter Conditions	cf	51.681	52.998	53.124	
T_m	Avg Meter Temperature	°F	70.3	78.3	82.7	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.4644	0.4705	0.4604	
Wt_{wc}	Weight Water Collected	Grams	13.3	18.6	21.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.3080	0.3080	0.3080	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	42.647	43.095	42.836	
Vw	Volume Water Vapor	scf	0.627	0.877	0.995	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.014	0.020	0.023	
X_d	Fraction of Dry Gas	Fraction	0.986	0.980	0.977	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.68	28.62	28.59	
%I	Percent Isokinetic	Percent	98.5	98.9	100.9	**AVG**
T_s	Avg Stack Temperature	°F	65.8	68.5	70.2	**68**
A_s	Stack Cross Sectional Area	Sq. Ft.	7.069	7.069	7.069	
P_G	Stack Static Pressure	In. H_2O	-0.09	-0.09	-0.09	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	24.24	24.24	24.24	
P_s	Stack Pressure	In. Hg. Abs	24.233	24.233	24.233	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	9.86E+03	9.92E+03	9.67E+03	**9.82E+03**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	1.23E+04	1.25E+04	1.23E+04	**1.24E+04**
V_s	Velocity of Stack Gas	fpm	1.74E+03	1.77E+03	1.74E+03	**1.75E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
C_F	Concentration of Fluoride	lb / dscf	9.460E-08	2.629E-07	4.045E-07	**2.540E-07**
C_F	Concentration of Fluoride	mg/dscf	4.291E-02	1.193E-01	1.835E-01	**1.152E-01**
ER_F	Emission Rate of Fluoride	lb / hr	0.056	0.157	0.235	**0.149**

$\frac{0.149}{32.13} = .0046$

FLUORIDE COMPLIANCE TESTS CONDUCTED ON THE PHOSPHORIC ACID PLANT STACK AND THE CONDITIONING VENT SCRUBBER STACK

FOR NU-WEST INDUSTRIES, INC. AGRIUM CONDA PHOSHPATE OPERATIONS

SODA SPRINGS, IDAHO

March 30, 2005

by:

TETCO
90 East Main
Lehi, UT 84043
Phone: 801 768-0973
Fax: 801 768-0880

Prepared for:

Nu-West Industries, Inc., Agrium
3010 Conda Road
Soda Springs, ID 83276

Date of Report:

April 20, 2005

SUMMARY OF RESULTS

Emission Results

Table I shows the fluoride emission results. Tables IV and V in Appendix A have more detailed testing data.

Table I Measured Fluoride Emissions

Run #	Phosphoric Acid			Conditioning Vent Scrubber		
	lb/dscf	mg/dscf	lb/hr	lb/dscf	mg/dscf	lb/hr
1	3.38e-08	1.53E-02	0.13	1.74E-08	7.87E-03	0.008
2	1.70E-08	7.73E-03	0.07	1.65E-08	7.49E-03	0.008
3	1.66E-08	7.52E-03	0.07	1.20E-08	5.46E-03	0.006
AVE	**2.25E-08**	**1.02E-02**	**0.88**	**1.53E-08**	**6.94E-03**	**0.007**

0.0086

Allowable Emissions

The allowable fluoride emissions for the Phosphoric Acid Plant Stack are 0.01350 lb/ton equivalent P_2O_5 feed as found in 40 CFR 63.603 (a).

Process Data

The process was operated according to standard procedures. All pertinent process information was available for recording by agency personnel. Production data will be submitted by Agrium personnel.

Discussion of Errors or Irregularities

None.

Percent Isokinetic Sampling

The Method 13B test runs were isokinetic within the ±10% of 100% criterion specified in the Federal Register. Isokinetic values for each test run are presented in Table II.

TABLE II Percent Isokinetic Sampling

	Percent Isokinetics	
Run #	Phosphoric Acid	Conditioning Vent Scrubber
1	99	100
2	100	100
3	101	99

TABLE IV
COMPLETE RESULTS
AGRIUM
PHOSPHORIC ACID PLANT SCRUBBER EXHAUST

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/30/05	3/30/05	3/30/05	
Begin	Time Test Began		13:32	15:16	16:45	
End	Time Test Ended		14:34	16:19	17:47	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	23.65	23.65	23.65	
ΔH	Orifice Pressure Drop	In. H_2O	1.679	1.755	1.743	
Y	Meter Calibration Y Factor	dimensionless	1.004	1.004	1.004	
Vm	Volume Gas Sampled--Meter Conditions	cf	49.170	50.256	49.981	
T_m	Avg Meter Temperature	°F	79.9	83.7	80.3	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.6460	0.6483	0.6457	
Wt_{wc}	Weight Water Collected	Grams	37.9	36.8	39.0	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.2545	0.2545	0.2545	
CO_2	Volume % Carbon Dioxide	Percent	1.80	1.80	1.60	
O_2	Volume % Oxygen	Percent	20.20	20.40	20.80	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	78.00	77.80	77.60	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	38.361	38.943	38.972	
Vw	Volume Water Vapor	scf	1.787	1.735	1.839	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.045	0.043	0.045	
X_d	Fraction of Dry Gas	Fraction	0.955	0.957	0.955	
M_d	Molecular Wt. Dry Gas	lb/lbmol	29.10	29.10	29.09	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.60	28.63	28.59	
%I	Percent Isokinetic	Percent	99.0	100.0	100.7	**AVG**
T_s	Avg Stack Temperature	°F	82.8	83.5	83.3	**83**
A_s	Stack Cross Sectional Area	Sq. Ft.	35.785	35.785	35.785	
P_G	Stack Static Pressure	In. H_2O	-0.21	-0.21	-0.21	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	23.59	23.59	23.59	
P_s	Stack Pressure	In. Hg. Abs	23.575	23.575	23.575	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	6.54E+04	6.57E+04	6.54E+04	**6.55E+04**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	8.94E+04	8.97E+04	8.94E+04	**8.95E+04**
V_s	Velocity of Stack Gas	fpm	2.50E+03	2.51E+03	2.50E+03	**2.50E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	0.588	0.301	0.293	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	0.588	0.301	0.293	
C_F	Concentration of Fluoride	lb / dscf	3.38E-08	1.70E-08	1.66E-08	**2.25E-08**
C_F	Concentration of Fluoride	mg/dscf	1.533E-02	7.729E-03	7.518E-03	**1.019E-02**
ER_F	Emission Rate of Fluoride	lb / hr	0.133	0.067	0.065	**0.088**

TABLE V
COMPLETE RESULTS
AGRIUM CONDA PHOSPHATE
CONDITIONING VENT SCRUBBER

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/30/05	3/30/05	3/30/05	
Begin	Time Test Began		13:32	15:16	16:45	
End	Time Test Ended		14:34	16:19	17:47	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	23.77	23.77	23.77	
ΔH	Orifice Pressure Drop	In. H_2O	1.501	1.618	1.676	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled--Meter Conditions	cf	49.460	51.812	52.519	
T_m	Avg Meter Temperature	°F	71.0	72.8	80.8	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.8337	0.8645	0.8806	
Wt_{wc}	Weight Water Collected	Grams	20.5	16.9	22.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.2220	0.2220	0.2220	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	39.881	41.651	41.603	
Vw	Volume Water Vapor	scf	0.967	0.797	1.042	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.023	0.019	0.022	
X_d	Fraction of Dry Gas	Fraction	0.977	0.981	0.978	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.59	28.63	28.59	
%I	Percent Isokinetic	Percent	100.0	100.3	98.7	**AVG**
T_s	Avg Stack Temperature	°F	60.9	60.5	60.6	**61**
A_s	Stack Cross Sectional Area	Sq. Ft.	3.142	3.142	3.142	
P_G	Stack Static Pressure	In. H_2O	-0.49	-0.49	-0.49	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	23.77	23.77	23.77	
P_s	Stack Pressure	In. Hg. Abs	23.734	23.734	23.734	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	7.77E+03	8.09E+03	8.21E+03	**8.02E+03**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	9.89E+03	1.02E+04	1.04E+04	**1.02E+04**
V_s	Velocity of Stack Gas	fpm	3.15E+03	3.26E+03	3.32E+03	**3.24E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	0.314	0.312	0.227	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	0.314	0.312	0.227	
C_F	Concentration of Fluoride	lb / dscf	1.74E-08	1.65E-08	1.20E-08	**1.53E-08**
C_F	Concentration of Fluoride	mg/dscf	7.873E-03	7.491E-03	5.456E-03	**6.940E-03**
ER_F	Emission Rate of Fluoride	lb / hr	0.008	0.008	0.006	**0.007**

M5 13B Nomenclature

%I = percent isokinetic, percent

A_s = stack cross-sectional area (ft^3)

ASΔP = see √ΔP

Btu = unit heat value (British thermal unit)

B_{ws} = fraction of water in stack gas

C_B = concentration of particulate matter, back half (gr/dscf,lb/dscf, etc.)

CB_{back} = concentration of pollutant in back half blank (i.e., mg). "Back" may be replaced with "water" or "acetone", etc.

CB_{front} = concentration of pollutant in front half blank (i.e., mg)

C_f = concentration of particulate matter, front half (gr/dscf,lb/dscf, etc.)

C_{metal} = concentration of metals (ppm, $\mu g/ft^3$, etc.) atomic symbol replaces "metal"

CO_2 = percent carbon dioxide in the stack gas

C_p = pitot tube coefficient (0.84)

CX_{back} = concentration of pollutant in back half, species identifier replaces "X" (lb/dscf)

CX_{front} = concentration of pollutant in front half, species identifier replaces "X" (lb/dscf)

$C_{X\ (avg)}$ = species symbol replaces *x*.

$C_{X\ (corr)}$ = actual gas concentration corrected to required percent O_2

ΔH = orifice pressure drop (inches H_2O)

$\Delta H_@$ = orifice pressure (inches H_2O)

ΔP = stack flow pressure differential (inches H_2O)

D_s = diameter of the stack (feet)

D_n = nozzle diameter (inches)

EA = percent excess air

ER_B = emission rate of back half particulate (lb/hr)

ER_F = emission rate of front half particulate (lb/hr)

ER_{mmBtu} = emission rate per mmBtu or ton of fuel etc.

ER_X = emission rate of compound which replaces x

ERX_{front} = front half emission rate of compount which replaces "X"

ERX_{back} = back half emission rate of compound which replaces "X"

k-fact = multiplier of test point ΔP to determine test point ΔH

L = length of rectangular stack (inches)

mBtu = thousand Btu

MB_{front} = mass of pollutant in front half blank (i.e., mg)

MB_{back} = mass of pollutant in back half blank (i.e., mg)

M_d = molecular weight of stack gas, dry basis (lb/lb-mol)

M_F = mass of particulate on filter (mg)

M_{FP} = mass of particulate matter on filter and probe (mg)

mmBtu = million Btu

M_P = mass of particulate matter in probe (mg)

M_s = molecular weight of stack gas, wet basis (g/gmol)

M_{Xfront} = mass of pollutant in front half before applying blank, species symbol replaces "X" (mg)

MX_{front} = total mass of pollutant in front half, species symbol replaces "X" (mg)

M_{Xback} = mass of pollutant in back half before applying blank, species symbol replaces "X" (mg)

MX_{back} = total mass of pollutant in back half, species symbol replaces "X" (mg)

N_2 = percent nitrogen in the stack gas

O_2 = percent oxygen in the stack gas

√ΔP = average of the square roots of ΔP (may also be referred to as ASΔP)

M5 13B Nomenclature

Pb_m = absolute barometric pressure at the dry gas meter (inches Hg)

Pb_p = absolute barometric pressure at the sample location (inches Hg)

P_G = stack static pressure (inches H_2O)

P_s = absolute stack pressure (inches Hg)

P_{std} = absolute pressure at standard conditions (29.92 inches Hg.)

θ = time of test (minutes)

Q_a = stack gas volumetric flow rate (acfm)

Q_s = stack gas volumetric flow rate (dscfm)

Q_W = wet stack gas std. volumetric flow (ft^3/min, wscfm)

T_s = stack temperature (^oF)

T_{std} = absolute temperature at standard conditions (528^oR)

Tt = see θ

u_m = mean molecular speed (cm/s)

Vm = sample volume (ft^3) at meter conditions

Vm_{std} = volume standard (dscf), sample volume adjusted to 68^oF and 29.92 inches Hg.

V_s = velocity of stack gas (fpm)

V_{wc} = volume water vapor (scf) at 68^oF and 29.92 inches Hg.

W = Width of rectangular stack (inches)

Wt_{wc} = weight of the condensed water collected (grams)

X_d = fraction of dry gas

Y = meter calibration Y-factor (dimensionless)

$$\%I = Vm_{std} \cdot (T_s + 460) \cdot 1039 / (\theta \cdot V_s \cdot P_s \cdot X_d \cdot D_n^2)$$

$$A_s = Ds^2 / 4 \cdot \pi$$

$$B_{ws} = V_w / (Vm_{std} + V_w)$$

$$C_B = M_B \cdot 0.01543 / Vm_{std}$$

$$C_f = M_{fp} \cdot 0.01543 / Vm_{std}$$

$$CX_{front} = MX_{front} / (Vm_{std} \cdot 1000 \cdot 453.6)$$

$$CX_{back} = MX_{back} / (Vm_{std} \cdot 1000 \cdot 453.6)$$

$$C_{X\ (corr)} = C_{X\ (avg)} \cdot (20.9 - \text{desired } \%O_2) / (20.9 - \text{actual } \%O_2)$$

$$D_{eq} = 2 \cdot L \cdot W / (L + W)$$

$$EA = (\%O_2 - 0.5\ \%CO) / [0.264\ \%N_2 - (\%O_2 - 0.5\ \%CO)]$$

$$ER_B = C_B \cdot Q_s \cdot 0.00857$$

$$ER_F = C_f \cdot Q_s \cdot 0.00857$$

$$ER_{mmBtu} = ER_X / (\text{mmBtu / hr})$$

$$ERX_{front} = CX_{front} \cdot Q_s \cdot 60$$

$$ERX_{back} = CX_{back} \cdot Q_s \cdot 60$$

$$\text{K-fact} = 846.72 \cdot Dn^4 \cdot \Delta H_@ \cdot C_p^2 \cdot X_d^2 \cdot M_d \cdot P_s \cdot (T_m + 460) / [M_s \cdot (T_s + 460) \cdot (Pb_m + \Delta H / 13.6)]$$

$$M_d = CO_2 \cdot 0.44 + O_2 \cdot 0.32 + N_2 \cdot 0.28$$

$$M_s = (M_d \cdot X_d) + (18 \cdot B_{ws})$$

$$P_s = Pb_p + (P_G / 13.6)$$

$$Q_a = V_s \cdot A_s$$

$$Q_s = Qa \cdot Xd \cdot Ps \cdot T_{std} / [(Ts + 460) \cdot P_{std}]$$

$$Q_W = Q_s / X_d$$

$$Vm_{std} = Vm \cdot Y \cdot T_{std} \cdot (Pb_m + \Delta H / 13.6) / [P_{std} \cdot (T_m + 460)]$$

$$V_s = 85.49 \cdot 60 \cdot Cp \cdot \sqrt{\Delta P} \cdot \sqrt{[(T_s + 460) / (P_s \cdot M_s)]}$$

$$V_{wc} = Wt_{wc} \cdot 0.04715$$

$$X_d = 1 - B_{ws}$$

FLUORIDE COMPLIANCE TESTS CONDUCTED ON THE SUPERPHOSPHORIC ACID PLANT STACK

FOR NU-WEST INDUSTRIES, INC. AGRIUM CONDA PHOSHPATE OPERATIONS

SODA SPRINGS, IDAHO

March 31, 2005

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Date of Report:

April 20, 2005

SUMMARY OF RESULTS

Emission Results

Table I shows the fluoride emission results. Table IV in Appendix A has more detailed testing data.

Table I Measured Fluoride Emissions

	lb/dscf	mg/dscf	lb/hr
1	9.46E-08	4.29E-02	0.056
2	2.63E-07	1.19E-01	0.157
3	4.05E-07	1.84E-01	0.235
AVE	**2.54E-07**	**1.15E-01**	**0.149**

Allowable Emissions

The allowable fluoride emissions for the Superphosphoric Acid Plant Stack are 0.00870 lb/ton equivalent P_2O_5 feed as found in 40 CFR 63 603 (b).

Process Data

The process was operated according to standard procedures. All pertinent process information was available for recording by agency personnel. Production data will be submitted by Agrium personnel.

Discussion of Errors or Irregularities

None.

TABLE VI
COMPLETE RESULTS
AGRIUM
SUPERPHOSPHORIC ACID PLANT SCRUBBER (SPA)

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/31/05	3/31/05	3/31/05	
Begin	Time Test Began		8:43	10:20	11:48	
End	Time Test Ended		9:47	11:24	12:51	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	24.28	24.28	24.28	
ΔH	Orifice Pressure Drop	In. H_2O	1.725	1.783	1.725	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled--Meter Conditions	cf	51.681	52.998	53.124	
T_m	Avg Meter Temperature	°F	70.3	78.3	82.7	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.4644	0.4705	0.4604	
Wt_{wc}	Weight Water Collected	Grams	13.3	18.6	21.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.3080	0.3080	0.3080	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	42.647	43.095	42.836	
Vw	Volume Water Vapor	scf	0.627	0.877	0.995	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.014	0.020	0.023	
X_d	Fraction of Dry Gas	Fraction	0.986	0.980	0.977	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.68	28.62	28.59	
%I	Percent Isokinetic	Percent	98.5	98.9	100.9	**AVG**
T_s	Avg Stack Temperature	°F	65.8	68.5	70.2	**68**
A_s	Stack Cross Sectional Area	Sq. Ft.	7.069	7.069	7.069	
P_G	Stack Static Pressure	In. H_2O	-0.09	-0.09	-0.09	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	24.24	24.24	24.24	
P_s	Stack Pressure	In. Hg. Abs	24.233	24.233	24.233	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	9.86E+03	9.92E+03	9.67E+03	**9.82E+03**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	1.23E+04	1.25E+04	1.23E+04	**1.24E+04**
V_s	Velocity of Stack Gas	fpm	1.74E+03	1.77E+03	1.74E+03	**1.75E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
C_F	Concentration of Fluoride	lb / dscf	9.460E-08	2.629E-07	4.045E-07	**2.540E-07**
C_F	Concentration of Fluoride	mg/dscf	4.291E-02	1.193E-01	1.835E-01	**1.152E-01**
ER_F	Emission Rate of Fluoride	lb / hr	0.056	0.157	0.235	**0.149**